Notice No.8

Rules and Regulations for the Classification of Ships, July 2017

The status of this Rule set is amended as shown and is now to be read in conjunction with this and prior Notices. Any corrigenda included in the Notice are effective immediately.

Please note that corrigenda amends to paragraphs, Tables and Figures are not shown in their entirety.

Issue date: June 2018

Amendments to	Effective date	IACS/IMO implementation (if applicable)
Part 3, Chapter 2, Section 3	1 July 2018	N/A
Part 3, Chapter 8, Section 2	1 July 2018	N/A
Part 3, Chapter 9, Section 6	1 July 2018	N/A
Part 3, Chapter 11, Section 8	1 July 2018	N/A
Part 3, Chapter 13, Section 8	1 July 2018	1 July 2018
Part 3, Chapter 13, Sections 9 & 10	1 July 2018	N/A
Part 4, Chapter 2, Section 1 & 3	1 July 2018	N/A
Part 4, Chapter 4, Section 8	1 July 2018	1 July 2018
Part 4, Chapter 8, Section 15	1 July 2018	N/A
Part 4, Chapter 9, Section 1	1 July 2018	N/A

Part 3, Chapter 2
Materials

■ *Section 3*
Corrosion protection

3.4 Aluminium and magnesium anodes

3.4.1 Aluminium and aluminium alloy anodes are permitted in tanks ~~used for the carriage of oil~~ which can contain explosive or flammable vapour, or in tanks adjacent to tanks which can contain explosive or flammable vapour, but only at locations where the potential energy of the anode does not exceed 275 J. The weight of the anode is to be taken as the weight at the time of fitting, including any inserts and fitting devices. The height of the anode is, in general, to be measured from the bottom of the tank to the centre of the anode. Where the anode is located on a horizontal surface (such as a bulkhead stringer) not less than 1 m wide, provided with an upstanding flange or face plate projecting not less than 75 mm above the horizontal surface, the height of the anode can be measured above that surface.

Existing paragraph 3.4.2 has been deleted.

Existing paragraph 3.4.3 has been renumbered 3.4.2.

~~3.4.4~~ 3.4.3 Magnesium or magnesium alloy anodes are ~~permitted only in tanks intended solely for water ballast~~ not permitted in tanks which can contain explosive or flammable vapour, or in tanks adjacent to tanks which can contain explosive or flammable vapour. Where permitted for other tanks, adequate venting must be provided.

Part 3, Chapter 8
Superstructures, Deckhouses and Bulwarks

■ *Section 2*
Scantlings of erections other than forecastles

2.3 Deck plating

2.3.1 The requirements of *Pt 3, Ch 8, 2.3 Deck plating* need not apply to effective superstructure decks of passenger ships and ferries where direct calculations have been carried out in accordance with the SDA procedure relevant to the ship type.

Existing paragraphs 2.3.1 and 2.3.2 have been renumbered 2.3.2 and 2.3.3.

2.4 Deck longitudinals and beams

2.4.1 The requirements of *Pt 3, Ch 8, 2.4 Deck longitudinals and beams* need not apply to effective superstructure decks of passenger ships and ferries where direct calculations have been carried out in accordance with the SDA procedure relevant to the ship type.

Existing paragraphs 2.4.1 and 2.4.2 have been renumbered 2.4.2 and 2.4.3.

Part 3, Chapter 9
Special Features

■ *Section 6*
Lifting appliances and support arrangements

6.7 Ramp supporting structure

6.7.1 The support structure (including hinges) in way of the interface between a ramp and the ship is to be assessed in accordance with the appropriate criteria given in *Ch 6, 2 Loading and design criteria* of the *Code for Lifting appliances in the Marine Environment, July 2017, incorporating Notice No. 1 & 2.*

6.7.2 The loads that the ramp supporting structure will be subjected to are to be submitted by the designer or Shipbuilder. These loads are to be calculated in accordance with *Ch 6, 2 Loading and design criteria* of the *Code for Lifting appliances in the Marine Environment, July 2017, incorporating Notice No. 1 & 2.* Load cases calculated in accordance with alternative standards can be accepted subject to agreement with Lloyd's Register.

6.7.3 Loads already existing in the supporting structure (other than those from the ramp) are to be superimposed if applicable.

6.7.4 Ramps forming part of the watertight integrity of the hull are also to be assessed in accordance with the applicable scantling requirements.

Part 3, Chapter 11
Closing Arrangements for Shell, Deck and Bulkheads

■ *Section 8*
Side and stern doors and other shell openings

8.4 Doors serving as ramps

8.4.2 ~~The design of the hinges for these doors should take into account the ship angle of trim or heel which may result in uneven loading of the hinges.~~ The support structure (including hinges) is to be assessed in accordance with *Pt 3, Ch 9, 6.7 Ramp supporting structure.*

Part 3, Chapter 13
Ship Control Systems

■ *Section 8*
Anchor ~~W~~windlass design and testing

8.1 General

8.1.1 A windlass ~~of sufficient power and suitable for the size of chain~~ used for handling anchors, suitable for the size of chain cable required by *Pt 3, Ch 13, 7 Equipment* and complying with the following criteria is to be fitted ~~to the ship~~. Where Owners require equipment significantly in excess of Rule requirements, it is their responsibility to specify increased windlass power.

8.1.2 The design, construction and testing of windlasses are to conform with a relevant National or International Standard or code of practice acceptable to LR. To be considered acceptable, the standard, or code of practice, is to specify criteria for evaluation of stresses, performance and testing.

8.1.3 Operation and maintenance procedures for the anchor windlass are to be incorporated in the vessel operations manual.

8.2 Plans and particulars to be submitted

8.2.1 The following plans showing the design specifications, the standard of compliance, engineering analyses and details of construction, as applicable, are to be submitted for evaluation:

- Windlass design specifications, anchor and chain cable particulars, performance criteria, and standard of compliance.
- Windlass foundation drawings inclusive of the supporting structure below deck. The details shall include bolts, chocks, shear stoppers etc. along with the foot print loads for the specified windlass ratings.
- Chain stopper foundation drawings inclusive of the supporting structure below deck. The details shall include bolts, chocks, shear stoppers etc. along with the foot print loads for the specified rating.
- Windlass arrangement plans showing all the components of the anchoring/mooring system such as the prime mover, shafting, cable lifter, anchors and chain cables; mooring winches, wires and fairleads, if they form part of the windlass machinery; brakes; controls; etc.
- Dimensions, materials, welding details, as applicable, of all torque-transmitting (shafts, gears, clutches, couplings, coupling bolts, etc.) and all load bearing (shaft bearings, cable lifter, sheaves, drums, bed-frames, etc.) components of the windlass and of the winch, where applicable, including brakes, chain stopper (if fitted), and foundation.
- Hydraulic system, to include:
  - (i) piping diagram along with system design pressure,
  - (ii) safety valves arrangement and settings,
  - (iii) material specifications for pipes and equipment,

(iv) typical pipe joints, as applicable, and
(v) technical data and details for hydraulic motors.
(vi) cooling systems arrangements for hydraulic system oil

- Electrical one-line diagram along with cable specification and size, motor controller, protective device rating or setting, as applicable.
- Control, monitoring and instrumentation arrangements.
- Engineering analyses for torque-transmitting and load-bearing components demonstrating their compliance with recognised standards or codes of practice. Analyses for gears are to be in accordance with a recognised standard.
- Calculations proving satisfactory inertia loads for the intended windlass, *see Pt 3, Ch 13, 8.4 Windlass design 8.4.1 (b)*.
- Plans and data for windlass electric motors including associated gears rated 100 kW and over.
- Calculations demonstrating that the windlass prime mover is capable of attaining the hoisting speed, the required continuous duty pull, and the overload capacity are to be submitted if the 'load testing' including 'overload' capacity of the entire windlass unit is not carried out at the shop (*see Pt 3, Ch 13, 8.9 Shop inspection and testing 8.9.1(b)*).

8.3 Materials and fabrication

8.3.1 Materials used in the construction of torque-transmitting and load-bearing parts of windlasses are to comply with LR *Rules for the Manufacture, Testing and Certification of Materials, July 2017, incorporating Notice No. 1 & 2* or an appropriate National or International Standard acceptable to LR, provided that the Standard gives reasonable equivalence to the requirement of LR. The proposed materials are to be indicated in the construction plans and are to be approved in connection with the design. All such materials are to be certified by the material manufacturers and are to be traceable to the manufacturers' certificates.

8.3.2 Weld joint designs are to be shown in the submitted construction plans and are to be appraised in association with the approval of the windlass design in accordance with an appropriate National or International Standard acceptable to LR.

8.3.3 Welding procedures, welding consumables and welders are to comply with the LR *Rules for the Manufacture, Testing and Certification of Materials, July 2017, incorporating Notice No. 1 & 2* or an appropriate National or International Standard acceptable to LR.

8.3.4 The degree of non-destructive examination of welds and post-weld heat treatment, if any, are to be specified and submitted for consideration.

~~8.1~~ 8.4 Windlass design

~~8.1.2~~ 8.4.1 In addition to the requirements of the National or International Standard or code of practice acceptable to LR (*see Pt 3, Ch 13, 8.1 General 8.1.2*) ~~The~~ the following performance ~~criteria~~ requirements are to be ~~used as a design basis for the windlass~~ complied with:

(a) Holding Loads: Calculations are to be made to show that, in the holding condition (single anchor, brake fully applied and chain cable lifter declutched) and under a load equal to 80 per cent of the specified minimum breaking strength of the chain cable, the maximum stress in each load bearing component will not exceed the maximum permissible yield. For installations fitted with a chain cable stopper, 45 per cent of the specified minimum breaking strength of the chain cable may instead be used for the calculation.
(b) Inertia Loads: The design of the drive train, including prime mover, reduction gears, bearings, clutches, shafts, cable lifter and bolting is to consider the dynamic effects of sudden stopping and starting of the prime mover or chain cable, so as to limit inertial load.

~~(a)~~(c) Continuous Duty Pull: The windlass is to have sufficient power to exert a continuous duty pull, Z_{cont1}, over a period of 30 minutes ~~of:~~ corresponding to the grade and diameter, d_c, of the chain cables as follows:

~~o~~ (i) for specified design anchorage depths up to 82,5 m when using ordinary stockless anchors:

Chain cable grade	~~Duty pull, *P*, in~~ Z_{cont1} (N)
U1	$37{,}5d_C^2$
U2	$42{,}5d_C^2$
U3	$47{,}5d_C^2$

~~o~~ (ii) for specified design anchorage depths greater than 82,5 m a continuous duty pull Z_{cont2} is:

~~$P_1 = P + (D_a - 82{,}5)0{,}27d_c^2$~~ $Z_{cont2} = Z_{cont1} + (D_a - 82{,}5) \times 0{,}27d_c^2$ N

Where
d_c = is the chain diameter, in mm
D_a = is the specified design anchorage depth, in metres
= ~~*P* is the duty pull for anchorage depth up to 82,5 m~~
= ~~P_1 is the duty pull for anchorage depths greater than 82,5 m.~~

The anchor masses are assumed to be the masses as given in *Table 13.7.2 Equipment - Bower anchors and chain* cables. The value of Z_{cont} is based on the hoisting of one anchor at a time, and also assumes that the effects of buoyancy and hawse pipe efficiency (assumed to be 70 per cent) have been accounted for. In general, stresses in each torque-transmitting component are not to exceed 40 per cent of yield strength (or 0,2 per cent proof stress) of the material under these loading conditions.

~~(b)~~(d) Overload Capability: The windlass prime mover is to ~~have sufficient power to exert,~~ be able to provide, for ~~over~~ a period of at least two minutes, the necessary temporary overload capacity for breaking out the anchor. This temporary overload capacity is to be a pull equal to the greater of:

i. short term pull:

1,5 times the continuous duty pull as defined in *Pt 3, Ch 13, 8.1 Windlass design ~~8.1.2.(a)~~ 8.4.1(c)*, or

ii. anchor breakout pull:

$$12{,}18Wa + \frac{7{,}0L_c d_c^{\,2}}{100}$$

where:

L_c = is the total length of chain cable on board, in metres, as given by *Table 13.7.2 Equipment – Bower anchors and chain cables*

W_a = is the mass of bower anchor (kg) as given in *Table 13.7.2 Equipment – Bower anchors and chain cables*.

Note: The speed in this period may be lower than normal.

(e) Hoisting Speed: The mean speed of the chain cable during hoisting of the anchor and cable is to be 0,15 m/s.

~~(f)~~ (c) ~~The windlass, with its braking system in action and in conditions simulating those likely to occur in service, is to be able to withstand, without permanent deformation or brake slip, a load, applied to the cable, given by:~~ Brake Capacity: The capacity of the windlass brake is to be sufficient to stop the anchor and chain cable when paying out the chain cable in a controlled manner. Where a chain cable stopper is not fitted, the brake is to produce a torque capable of withstanding a pull equal to 80 per cent of the specified minimum breaking strength of the chain cable without any permanent deformation of strength members and without brake slip. Where a chain cable stopper is fitted, 45 per cent of the breaking strength may instead be applied. The following simplified formula is to be used to calculate the required brake capacity:

$K_b\, d_c^{\,2}\,(44 - 0{,}08d_c)$ N

Where K_b is given in *Table 13.8.1 Values of K_b*.

~~The performance criteria are to be verified by means of shop tests in the case of windlasses manufactured on an individual basis. Windlasses manufactured under LR's *Type Approval Scheme for Marine Engineering Equipment* will not require shop testing on an individual basis.~~

Table 13.8.1 Values of K_b

	K_b	
Cable grade	Windleass used in conjunction with chain stopper	Chain stopper not fitted
~~-~~	~~N~~	~~N~~
U1	4,41	7,85
U2	6,18	11,0
U3	8,83	15,7

8.4.3 As an alternative to conducting the engineering analyses required by *Pt 3, Ch 13, 8.4 Windlass Design 8.4.2*, approval of the windlass mechanical design can be based on a type test, in which case the testing procedure is to be submitted for consideration.

~~8.1.3~~ 8.4.4 Calculations for torque transmitting components are to be based on 1500 hours of operation with a nominal load spectrum factor of K_m = 1,0. Alternatively unlimited hours with K_m = 0,8 can be applied.

~~8.1.4 Where the available input torque exceeds the torque required for anchor breakout then torque overload protection is to be fitted.~~

~~**8.2 Calculations**~~

~~8.2.1 Where shop testing is not possible and Type Approval has not been obtained, calculations demonstrating compliance with *Pt 3, Ch 13, 8.1 Windlass design 8.1.2* are to be submitted together with detailed plans and an arrangement plan showing the following components:~~

- ~~Shafting~~
- ~~Gearing is to meet the requirements as per *Part 5, Chap 5, Sect 1.0*, where the gearing is rated for 100kW and over it is to be certified.~~
- ~~Brakes~~
- ~~Clutches~~

~~8.2.2 The maximum stress from load cases stated in *Table 13.8.2 Design load cases for the windlass* are not to exceed the limits stated in *Table 13.8.3 Permissible stress for design load cases*.~~

Table 13.8.2 Design load cases for the windlass

Load case	Condition	Note
1	Continuous pull	*See Pt 3, Ch 13, 8.1 Windlass design 8.1.2.(a)*
2	Overload pull	*See Pt 3, Ch 13, 8.1 Windlass design 8.1.2.(b)*
3	Brake holding load	*See Pt 3, Ch 13, 8.1 Windlass design 8.1.2.(c)*

Table 13.8.3 Permissible stress for design load cases

-	Load case	
Stress	1 and 2	3
-	Permissible stress	
Tension	0,8*Y*	0,9*Y*
Compression or bending	0,8*Y*	0,9*Y*
Shear	0,7*Y*	0,7*Y*
Combined	0,85*Y*	0,9*Y*

Note *1.* Where a component is subjected to axial tensile, axial compressive, bending or shear stress, F_c is to be calculated in the normal manner.
Note *2.* Where a component is subjected to a combination of co-existent stresses, F_c is the combined stress which is to be calculated as follows:
Combined bending and tension

$$F_c = 1,25 f_c + f_{bt}$$

Combined bending and compression

$$F_c = f_c + f_{bc}$$

Combined bending, tension and shear

$$F_c = \sqrt{(1,25 f_t + f_{bt})^2 + 3 f_q^2}$$

Combined bending, compression and shear

$$F_c = \sqrt{(f_c + f_{bc})^2 + 3 f_q^2}$$

= where

f_t = is the calculated axial tensile stress
f_c = is the calculated axial compressive stress
f_{bt} = is the calculated maximum tensile stress due to bending about both principal axes
f_{bc} = is the calculated maximum compressive stress due to bending about both principal axes
f_q = is the calculated shear stress
Y = is the specified 0,2 per cent proof stress for the material

8.2.3 8.4.5 The following criteria are to be used for gearing design:

(a) Torque is to be based on the performance criteria specified in *Pt 3, Ch 13, 8.1 8.4 Windlass design 8.1.2 8.4.1*.
(b) The use of an equivalent torque, T_{eq}, for dynamic strength calculations is acceptable but the derivation is to be submitted to LR for consideration.
(c) The application factor for dynamic strength calculation, K_A, is to be 1,15.
(d) Calculations are to be based on 1500 hours of operation.
(e) The static torque is to be 1,5 x T_n where T_n is the nominal torque.
(f) The minimum factors of safety for load capacity of spur and helical gears, as derived using ISO 6336 or a relevant National or International standard acceptable to LR, are to be 1,5 for bending stress and 0,6 for contact stress.

Gears intended to transmit power greater than 100kW are to be certified by LR, the gears are to meet the requirements of *Pt 5, Ch 5, Gearing*.

8.2.4 Keyways are to be designed to a relevant National or International standard acceptable to LR.

8.2.5 The maximum stress in brake components is not to exceed the permissible stress stated in *Table 13.8.3 Permissible stress for design load cases*.

8.4 Maintenance arrangements

8.4.1 Access is to be provided for inspection of reduction gears, bearings, brakes, etc.

8.4.2 Accessible manual lubrication points, including nipples, are to be provided for both for oil and grease, as applicable.

~~8.4.3 Gear-boxes are to be provided with adequate access arrangements for monitoring and replacing oil.~~

8.5 Hydraulic systems

8.5.1 Hydraulic systems where employed for driving windlasses are to comply with the requirements of *Pt 5, Ch 14, 7 Hydraulic systems.*

~~8.6 Marking and identification~~

~~8.6.1 Controls are to be permanently marked for identification, unless their functions are readily apparent. If required, instructions are to be permanently marked and readily visible.~~

8.6 Electrical systems

8.6.1 Electric motors are to meet the requirements of *Pt 6, Ch 2, 9 Rotating machines*. Motors exposed to weather are to have enclosures suitable for their location, *see also Pt 6, Ch 2, 1.11, Location and construction 1.11.1*.

8.6.2 Motor branch circuits are to be protected in accordance with the applicable Rules, and cable sizing is to be in accordance with the requirements of the *Pt 6, Ch 2, 11, Electric cables, optical fibre cables and busbar trunking systems (busways)*.

Existing sub-Section 8.3 has been renumbered 8.7.

~~8.5~~ 8.8 Protection arrangements

Existing paragraphs 8.5.1 to 8.5.4 have been renumbered 8.8.1 to 8.8.4.

8.8.5 Electrical cables installed in exposed locations on open deck are to be provided with effective mechanical protection.

8.8.6 Means are to be provided to contain potential debris resulting from severe damage of the prime mover due to over-speed in the event of uncontrolled rendering of the cable, particularly when an axial piston type hydraulic motor forms the prime mover.

~~8.1.5~~ 8.8.7 An arrangement to release the anchor and chain in the event of windlass power failure is to be provided. Windlasses are to be fitted with couplings which are capable of disengaging between the cable lifter and the drive shaft. Hydraulically or electrically operated couplings are to be capable of being disengaged manually.

~~8.1.6~~ 8.8.8 The design of the windlass is to be such that the following requirements or equivalent arrangements will minimise the probability of the chain locker or forecastle being flooded in bad weather:

(a) a weathertight connection can be made between the windlass bedplate, or its equivalent, and the upper end of the chain pipe by means of cover or seal, and

(b) access to the chain pipe is adequate to permit the fitting of a cover or seal, of sufficient strength and proper design, over the chain pipe while the ship is at sea.

8.9 Shop inspection and testing

8.9.1 Windlasses are to be inspected during fabrication at the manufacturers' facilities by a Surveyor for conformance with the approved plans. Acceptance tests, as specified in the specified Standard (*see Pt 5, Ch 13, 8.1 General 8.1.2*), are to be witnessed by the Surveyor and include the following tests, as a minimum:

(a) No-load test. The windlass is to be run without load at nominal speed in each direction for a total of 30 minutes. If the windlass is provided with a gear change, an additional run in each direction for 5 minutes at each gear change is required.

(b) Load test. The windlass is to be tested to verify that the continuous duty pull, overload capacity and hoisting speed as specified in *Pt 3, Ch 13, 8.4 Windlass design 8.4.1* can be achieved.

Where the manufacturing works does not have adequate facilities, these tests, including the adjustment of the overload protection, can be carried out on board ship. In these cases, functional testing in the manufacturer's works is to be performed under no-load conditions.

(c) Brake capacity test. The holding power of the brake is to be verified through testing if not verified by calculation.

~~8.7.2~~ 8.9.2 Windlass performance characteristics specified in ~~*Pt 3, Ch 13, 8.1 Windlass design 8.1.2 and Pt 3, Ch 13, 8.7 Testing and acceptance 8.7.1*~~ *Pt 5, Ch 13, 8.9 Shop inspection and testing 8.9.1* are based on the following assumptions:

(a) one cable lifter only is connected to the drive shaft;

(b) continuous duty and short term pulls are measured at the cable lifter;

~~(c) brake tests are carried out with the brakes fully applied and the cable lifter declutched;~~

~~(d) the probability of declutching a cable lifter from the motor with its brake in the off position is minimised;~~

~~(e)~~(c) hawse pipe efficiency assumed to be 70 per cent.

~~8.7~~ 8.10 ~~Testing and acceptance~~ On-board testing

8.10.1 Each windlass is to be tested under working conditions after installation on board to demonstrate satisfactory operation. Each unit is to be independently tested for braking, clutch functioning, lowering and hoisting of the chain cable and anchor, proper riding of the chain over the cable lifter, proper transit of the chain through the hawse pipe and the chain pipe, and effecting proper stowage of the chain and the anchor. It is to be confirmed that anchors properly seat in the stored position and that chain stoppers

function as designed, if fitted. The braking capacity is to be tested by intermittently paying out and holding the chain cable by means of the application of the brake.

~~8.7.1~~ 8.10.2 ~~During trials on board ship, the windlass is to be shown to be capable of:~~

(a) ~~for all specified design anchorage depths: raising the anchor from a depth of 82,5 m to a depth of 27,5 m at a mean speed of 9 m/min; and~~

(b) ~~for specified design anchorage depths greater than 82,5 m: in addition to (a), raising the anchor from the specified design anchorage depth to a depth of 82,5 m at a mean speed of 3 m/min.~~

The mean hoisting speed, as specified in *Pt 3, Ch 13, 8.4 Windlass design 8.4.1 (e)* is to be measured and verified. For testing purposes, the speed is to be measured over two shots of chain cable and initially with at least three shots of chain (82,5 m or 45 fathoms in length) and the anchor submerged and hanging free. ~~Where the depth of water in the trial area is inadequate, suitable equivalent simulating conditions will be considered as an alternative.~~ Following trials, the ship will be eligible to be assigned a descriptive note **specified design anchorage depth . . . metres**, which will be entered in column 6 of the *Register Book*.

8.10.3 Load testing is to be carried out if this was not previously completed as required by *Pt 3, Ch 13, 8.9 Shop inspection and testing 8.9.1 (b).*

8.10.4 Where the depth of water in the trial area is inadequate, suitable equivalent simulating conditions will be considered as an alternative.

~~8.8 Winch design and testing~~

~~8.8.1 A winch of sufficient power and suitable for the size of wire rope and chain cable is to be fitted to the ship. Where owners require equipment significantly in excess of Rule requirements, it is their responsibility to specify increased winching power.~~

~~8.8.2 The requirements of *Pt 3, Ch 13, 8.1 Windlass design 8.1.2*, *Pt 3, Ch 13, 8.2 Calculations 8.2.1* and *Pt 3, Ch 13, 8.7 Testing and acceptance 8.7.1* respectively are to be applied as performance criteria for winches assuming an equivalent U2 Grade chain cable diameter and Rule length for the same equipment letter. When applying the requirements of *Pt 3, Ch 13, 8.1 Windlass design 8.1.2.(c)* the factor K_b is to be taken as specified for when a chain stopper is not fitted.~~

~~8.9 Testing of equipment~~

~~8.9.1 All anchors and chain cables are to be tested at establishments and on machines recognised by the Committee and under the supervision of LR's Surveyors or other Officers recognised by the Committee, and in accordance with *Ch 10 Equipment for Mooring and Anchoring* of the Rules for Materials.~~

~~8.9.2 Test certificates showing particulars of weights of anchors, or size and weight of cable and of the test loads applied are to be furnished. These certificates are to be examined by the Surveyors when the anchors and cables are placed on board the ship.~~

~~8.9.3 Steel wire and fibre ropes are to be tested as required by *Ch 10 Equipment for Mooring and Anchoring* of the Rules for Materials.~~

~~8.9.4 For holding power testing requirements relating to high holding power anchors, *see Ch 10, 1.7 Super high holding power (SHHP) anchors* of the Rules for Materials.~~

8.11 Marking and identification

8.11.1 The windlass is to be permanently marked with the following information:

(a) Nominal size of the cable chain including mean diameter, grade and percentage of the breaking load the windlass is designed to hold (e.g. 100/3/45).

(b) Maximum anchorage depth, in metres.

Existing sub-sections 8.10 and 8.11 have been renumbered 8.12 and 8.13.

■ *Section 10*
Anchoring equipment in deep and unsheltered water

10.1 General

10.1.1 It is recommended that the equipment requirements specified in this Section are complied with if the vessel intends to anchor in deep and unsheltered water. Where a ship's anchoring equipment complies with the requirements of this Section, the ship will be eligible to be assigned the special features notation **DWA**.

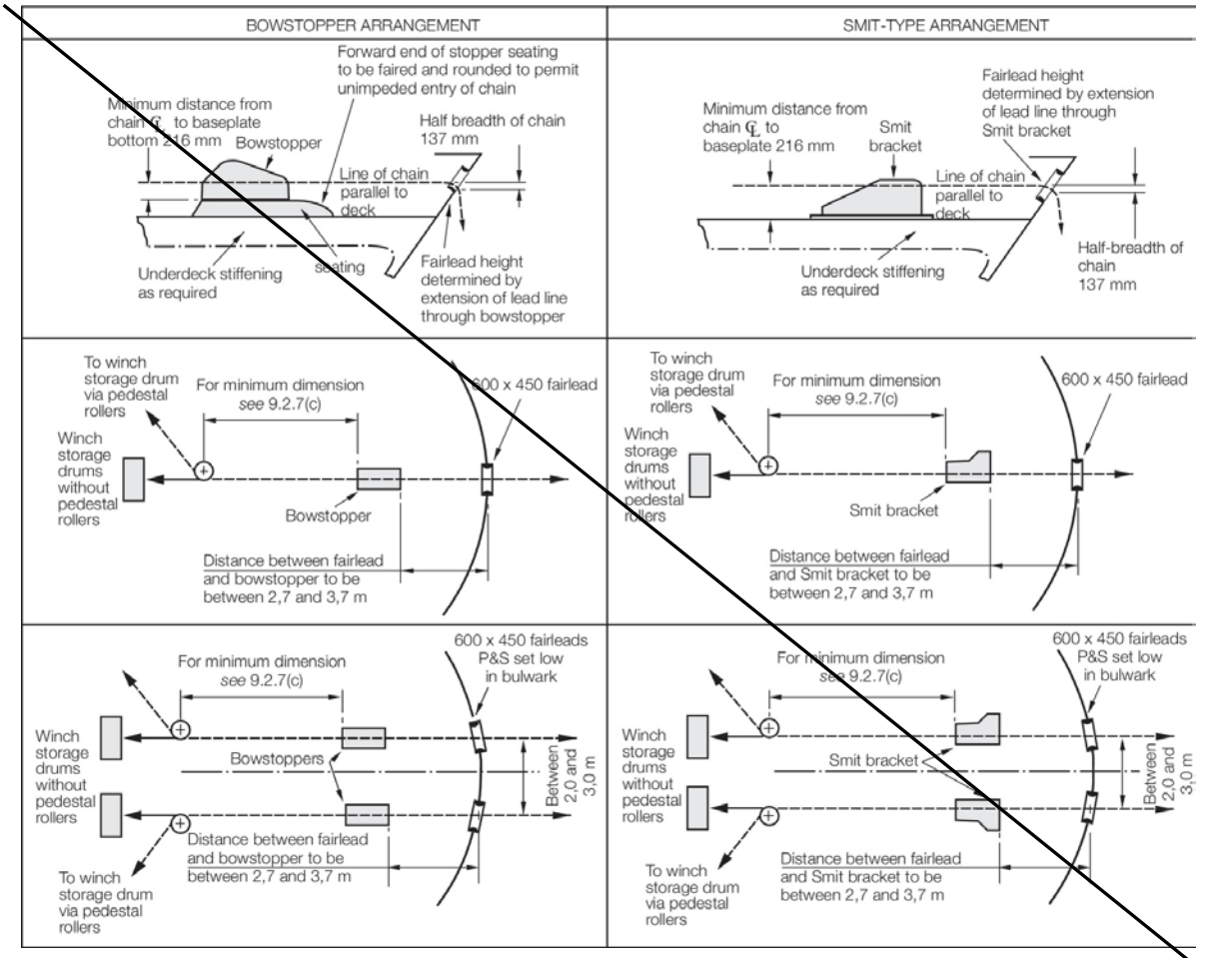
■ *Section 11*

Mooring of ships at single point moorings

11.1 General

11.1.1 These requirements are applicable to ~~ships intended~~ conventional oil tankers which intend to utilise the fittings standardised for single point moorings ~~and~~. For other ship types, the applicability would be specially considered. The requirements specified include the type, strength and location of the required fittings.

11.1.2 A ship provided with mooring arrangements in accordance with the requirements of this Section will be eligible to be assigned the Class notation **SPM4** where a single mooring line arrangement is provided for and **DSPM4** where a dual mooring line arrangement is provided for, *see Figure ~~13.9.1 Positioning of fairleads, chainstoppers and pedestal roller leads.~~ 13.11.1 Positioning of forward fairleads, bow chain stoppers and pedestal roller leads.*



~~Figure 13.11.1 Positioning of fairleads, chainstoppers and pedestal roller leads~~

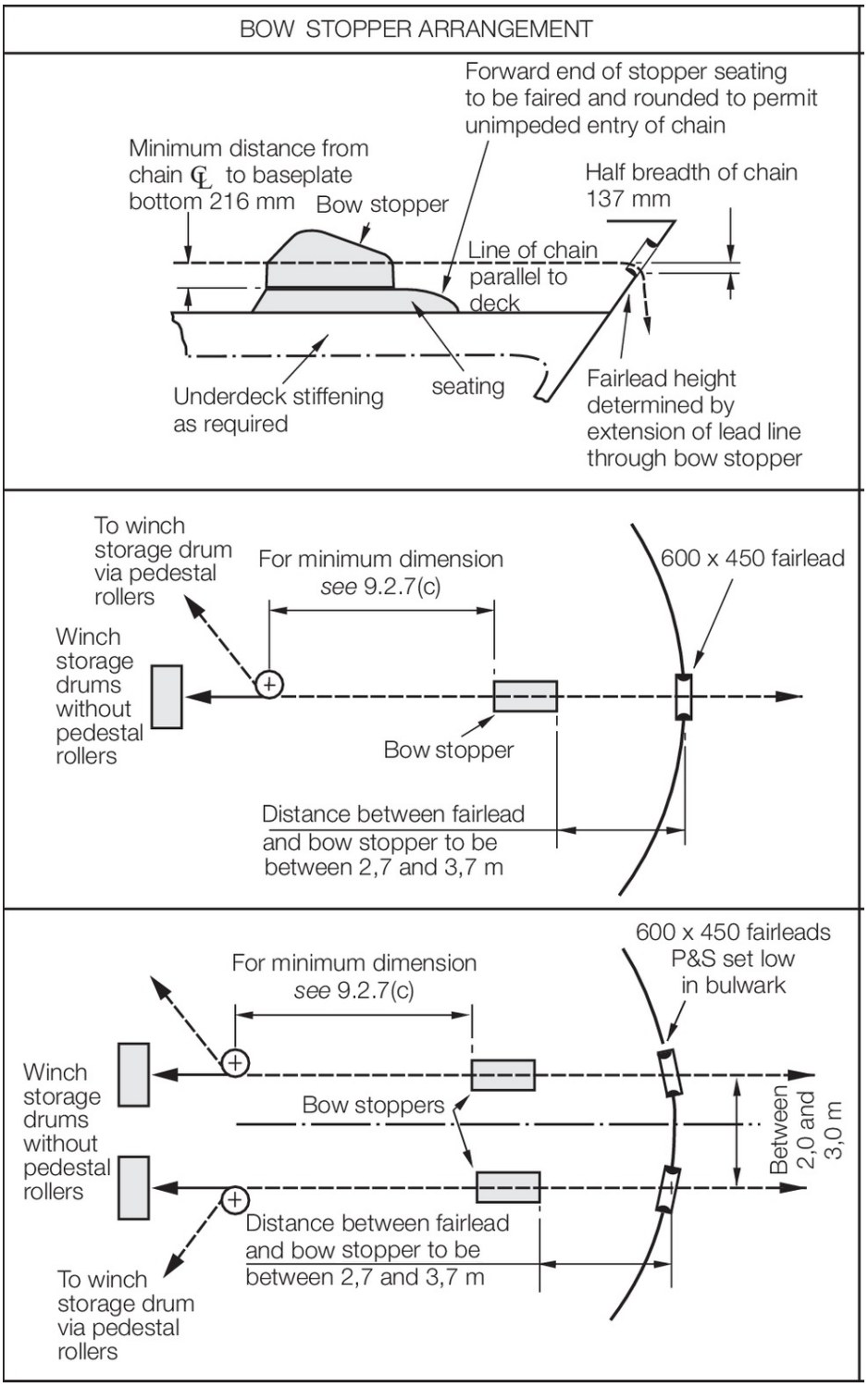


Figure 13.11.1 Positioning of forward fairleads, bow chain stoppers and pedestal roller leads

11.2 Arrangements

11.2.1 The ship is to be fitted with bow chain stoppers ~~and/or Smit-Type Brackets,~~ and bow fairleads. In addition, pedestal roller fairleads may be required for alignment purposes but a direct straight lead from the chain stopper to the winch storage drum is the preferred arrangement. However, consideration of safety and protection from risk of injury to mooring personnel should take priority in determining whether pedestal rollers should be fitted as well as their number and positioning.

(Part only shown)

11.2.3 Bow chain stoppers:

(b) Bow chain stoppers should be located between 2,7 m and 3,7 m aft of the bow fairlead and should be positioned so as to give correct alignment with the bow fairlead and the pedestal fairlead or the storage drum of the winch, *see Figure ~~13.11.1~~*

~~*Positioning of fairleads, chainstoppers and pedestal roller leads.*~~ *13.9.1 Positioning of forward fairleads, bow chain stoppers and pedestal roller leads*.

~~11.2.4 Smit-Type Brackets:~~

~~(a) Smit-Type Brackets may be fitted in lieu of bow chain stoppers for Group I and II. The fitting of Smit-Type Brackets in lieu of bow chain stoppers for Group III will be specially considered. The required number and safe working load are as given in *Table 13.11.2 Fittings requirements for deadweight group* for bow chain stoppers.~~

~~(b) The scantlings of the pin, connecting brackets and welded attachments to the baseplate are to be determined in association with a horizontal load of 2 x SWL and a permissible shear stress of 78 N/mm^2.~~

~~(c) Where fitted, Smit-Type Brackets should be located between 2,7 m and 3,7 m aft of the bow fairlead and should be positioned so as to give correct alignment with the bow fairlead and pedestal fairlead or the storage drum of the winch, *see Figure 13.11.1 Positioning of fairleads, chainstoppers and pedestal roller leads*.~~

~~(d) To facilitate connection to the terminal equipment it is recommended that each Smit-Type Bracket be provided with a length of chain cable comprising a pear link, an open link, and a special shackle, *see Figure 13.11.2 Special shackle Dimensions in mm* unless otherwise stated. The safe working load should be as given in *Table 13.11.2 Fittings requirements for deadweight group* for bow stoppers.~~

~~(e) Adjacent to each Smit-Type Bracket a lug with a recommended safe working load of 490 kN should be attached to the doubler plate. The lug should be provided with a hole of sufficient size to accept the pin of a 490 kN SWL shackle and should be used as a securing point for the chafe chain holding stopper.~~

~~(f) The Smit-Type Bracket(s) are to be type approved confirming that they are constructed in strict compliance with a standard recognised by LR which specifies SWL, yield strength and safety factors.~~

~~11.2.5~~ 11.2.4 The ~~forecastle~~ deck in way of bow chain stoppers ~~or Smit-Type Brackets~~ is to have a minimum thickness of 15 mm. Their foundations, welds attaching them to the ship and associated ship supporting structure are to be demonstrated adequate to resist horizontal loads equal to 2 x SWL as given in *Table 13.11.2 Fittings requirements for deadweight group*. This is to be accomplished by ~~detailed~~ suitable engineering analysis or calculations together with an inspection of the installation.

~~11.2.6~~ 11.2.5 Bow chain stoppers ~~or Smit-Type Brackets~~ are to be permanently marked with the SWL and appropriate serial numbers so that the certificates can be easily cross-referenced to the fitted equipment.

(Part only shown)

~~11.2.7~~ 11.2.6 Bow fairleads:

(a) One centrally located bow fairlead should be provided for ships fitted with one bow chain stopper ~~or Smit-Type bracket~~. Two bow fairleads should be provided for ships fitted with two bow chain stoppers ~~or Smit-Type brackets~~, *see Figure ~~13.11.1 Positioning of fairleads, chainstoppers and pedestal roller leads.~~ 13.11.1 Positioning of forward fairleads, bow chain stoppers and pedestal roller leads*.

(b) Bow fairlead openings should be at least 600 x 450 mm for 76 mm chafe chain size. Where more than one bow fairlead is installed, the spacing of centres should be between 2 m and 3 m.

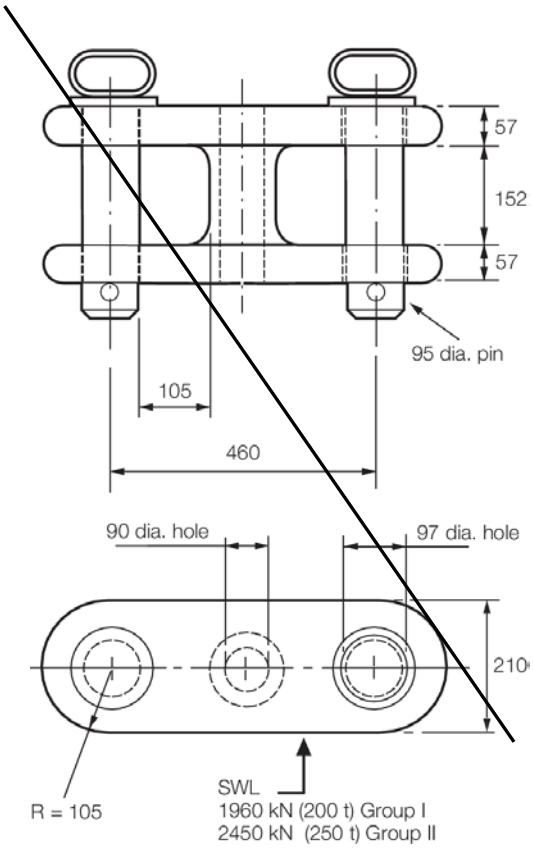
(c) The height of the centre of the bow fairlead opening above the ~~forecastle~~ deck should be determined by the extension, parallel to the deck, of the lead line of the chain cable to the bow chain stopper ~~or Smit-Type Bracket~~, *see Figure ~~13.11.1 Positioning of fairleads, chainstoppers and pedestal roller leads.~~ 13.11.1 Positioning of forward fairleads, bow chain stoppers and pedestal roller leads*. The fairlead should have a minimum radius equal to seven times the chain radius.

(Part only shown)

~~11.2.8~~ 11.2.7 Pedestal roller fairleads:

(c) The minimum distance of pedestal roller fairleads from the bow chain stopper ~~or Smit-Type Bracket~~ should be 3,0 m. Any variation in the minimum distance will be specially considered.

(d) Details of local strengthening of the ~~forecastle~~ deck in way of pedestal roller fairleads should be submitted for approval.



~~Figure 13.11.2 Special shackle~~
~~Dimensions in mm unless otherwise stated~~

Part 4, Chapter 2
Ferries, Roll on-Roll off Ships and Passenger Ships

■ *Section 1*
General

1.1 Application

(Part only shown)
1.1.4 The scantlings of the primary supporting structure for multi-decked passenger ships are to be assessed by direct calculation, in accordance with the *ShipRight Structural Design Assessment Procedure* for passenger ships, wherever:
(c) a limited number of transverse bulkheads above the bulkhead deck are present to carry the racking response~~.~~ ; or
(d) as required by Lloyd's Register (hereinafter referred to as 'LR').
See also Pt 4, Ch 2, 1.3 Class notations 1.3.7 and *Pt 4, Ch 2, Direct calculation.*

1.1.5 A multi-decked ship is generally defined as a ship having one or more continuous decks above the bulkhead deck which contribute to the global strength of the ship. The efficiency of decks can vary in conjunction with their length, scantlings arrangement and materials.

Existing paragraphs 1.1.5 to 1.1.6 have been renumbered 1.1.6 and 1.1.7.

1.3 Class notations

1.3.7 The 'Structural Design Assessment' (**SDA**) and 'Construction Monitoring' (**CM**) procedures detailed in the *ShipRight Procedures Manual*, published by ~~Lloyd's Register (hereinafter referred to as 'LR')~~, are mandatory for multi-decked passenger ships where it is considered that the superstructure will be subjected to a significant load from flexure of the hull girder; or, where it is required to utilise the load carrying capacity of the superstructure for longitudinal strength, and for other passenger ships of abnormal hull form, or of unusual structural configuration or complexity.

■ *Section 3*
Deck structure

3.1 Loading

(Table not shown)
Table 2.3.2 Thickness of deck plating for ferries and passenger ships where a relevant SDA is applied

3.2 Deck plating

3.2.1 ~~For ferries and passenger ships classed **100A1** the minimum thicknesses of decks are to be in accordance with *Table 2.3.2 Thickness of deck plating.*~~ For ferries, roll on-roll off cargo ships and passenger ships (other than for vehicle decks), the minimum thicknesses of decks are to be in accordance with *Pt 4, Ch 1 General Cargo Ships* or *Pt 3, Ch 8 Superstructures, Deckhouses and Bulwarks* as appropriate.

3.2.2 For ferries and passenger ships where direct calculations have been carried out in accordance with the SDA procedure relevant to the ship type (including multi-decked ships), the minimum thicknesses of decks are to be in accordance with *Table 2.3.2 Thickness of deck plating for ferries and passenger ships where a relevant SDA is applied.*

Existing paragraphs 3.2.2 to 3.2.6 have been renumbered 3.2.3 to 3.2.7.

3.3 Deck stiffening

3.3.1 For ferries, roll on-roll off cargo ships and passenger ships, the deck stiffening (other than for vehicle decks) ~~will~~ is generally to be in accordance with *Pt 4, Ch 1 General Cargo Ships* or *Pt 3, Ch 8 Superstructure, Deckhouses and Bulwarks* as appropriate. ~~However, in view of the complexity of some multi-deck arrangements in association with large freeboards, deck stiffening may require special consideration.~~

3.3.2 For ferries and passenger ships where direct calculations have been carried out in accordance with the SDA procedure relevant to the ship type (including multi-decked ships), the deck stiffening is to be in accordance with *Table 2.3.3 Modulus of deck beams and longitudinals for ferries and passenger ships where a relevant SDA is applied.*

~~3.3.2~~ 3.3.3 Vehicle deck beams and longitudinals are to have scantlings in accordance with the requirements for wheeled vehicles as specified in *Pt 3, Ch 9, 3 Decks loaded by wheeled vehicles*. Where vehicle decks are also to be used for the carriage of cargo, the scantlings derived from *Pt 3, Ch 9, 3 Decks loaded by wheeled vehicles* are to be not less than would be required by *Pt 4, Ch 1, 4.3 Deck stiffening*.

~~3.3.3 In multi-decked ships with high freeboards, the section modulus of deck beams and longitudinals is to be not less than the value given by Table 2.3.3 Modulus of deck beams and longitudinals for multi-decked ships with high freeboards.~~

(Table not shown)

Table 2.3.3 Modulus of deck beams and longitudinals ~~for multi-decked ships with high freeboards~~ for ferries and passenger ships where a relevant SDA is applied

3.4 Deck supporting primary structure

3.4.1 For ferries, roll on-roll off cargo ships, and passenger ships the primary structure supporting four or more point loads or a uniformly distributed load is to be in accordance with *Pt 4, Ch 1, Table 1.4.6 Deck girders, transverses and hatch beams.*

~~3.4.1~~ 3.4.2 For ferries and passenger ships where direct calculations have been carried out in accordance with the SDA procedure relevant to the ship type (including multi-decked ships), the ~~The~~ section modulus of primary members supporting four or more point loads or a uniformly distributed load is not to be taken as less than:

$$Z = 0{,}673 S P_S k l_e^2 \ (\text{cm}^3)$$

where

$\neq$ l_e, S, Z_T and k are as defined in *Pt 4, Ch 1, 1.5 Symbols and definitions*

P_s = deck design loading, in kN/m^2, see *Table 2.3.1 Design deck loadings (ferries and passenger ships only).*

~~3.4.2~~ 3.4.3 For ferries and passenger ships where direct calculations have been carried out in accordance with the SDA procedure relevant to the ship type (including multi-decked ships), the ~~The~~ moment of inertia of primary members supporting more than four point loads is not to be taken as less than:

$$I = \frac{1{,}85}{k} l_e Z \ (\text{cm}^4)$$

where

$\neq$ Z ~~and~~, l_e and k are as defined in ~~*Pt 4, Ch 2, 3.4 Deck supporting primary structure 3.4.1*~~ *Pt 4, Ch 1, 1.5 Symbols and definitions*.

~~3.4.3~~ 3.4.4 Scantlings of primary structure are to be verified for the following cases using direct calculation methods.

(a) The structural support arrangement is complex either due to arrangement or loading pattern.
(b) Large openings are incorporated in the webs of primary members.
(c) The structure is of novel or unusual design.
(d) Primary members supporting up to three point loads.

The stress criteria in *Table 1.4.6 Deck girders, transverses and hatch beams* in Chapter 1 are to be complied with.

Existing paragraphs 3.4.4 to 3.4.5 have been renumbered 3.4.5 to 3.4.6.

Part 4, Chapter 4
Offshore Support Vessels

■ *Section 8*
Transport and handling of ~~limited amounts of~~ hazardous and noxious liquid substances in bulk

Existing sub-Sections 8.1 to 8.22 have been deleted and replaced with the following.

8.1 Scope

8.1.1 This Section applies to the arrangement and scantling of sea-going ships as defined in *Pt 4, Ch 4, 1.1 Application* and intended for the carriage of hazardous and noxious substances, i.e.;

(d) Products which are listed in chapter 17 or chapter 18 of the IBC Code and the latest edition of the MEPC.2/Circular (Provisional categorization of liquid substances in accordance with MARPOL Annex II and the IBC Code) and their related references to chapter 15 and chapter 19; or
(e) Oil-based/water-based mud containing mixtures of products listed in 1(a); or
(f) Liquid carbon dioxide (high purity and reclaimed quality) and liquid nitrogen; or
(g) Contaminated backloads.

8.1.2 The requirements of this Section are non-mandatory and need not be complied with for classification with Lloyd's Register, although compliance may be insisted upon, in part or in full, by the Flag Administration.

8.1.3 Ships complying with the requirements of this Section will be eligible for the optional special feature notation **HNLS**.

8.1.4 Carriage of products not listed in *Pt 4, Ch 4, 8.1 Scope 8.1.1* may be permitted in accordance with the *Code for the transport and handling of hazardous and noxious liquid substances in bulk on offshore support vessels (OSV Chemical Code) 1.1 Application 1.1.10.*

8.1.5 Compliance with the *Code for the transport and handling of hazardous and noxious liquid substances in bulk on offshore support vessels (OSV Chemical Code)* will warrant the issuance of a certificate of fitness in line with the *Code for the transport and handling of hazardous and noxious liquid substances in bulk on offshore support vessels 1.4 Surveys and certification 1.4.1.*

8.1.6 This Section is to be considered as additional to the requirements listed in *Pt 4, Ch 4 Offshore support vessels* of the *Rules and Regulations for the Construction and Classification of Ships, July 2017, incorporating Notice No. 1, 2, 3 & 4*.

8.2 Definitions and equivalents

8.2.1 The definitions applicable to this Section are as per the *Code for the transport and handling of hazardous and noxious liquid substances in bulk on offshore support vessels (OSV Chemical Code) 1.2 Definitions*.

8.2.2 Equivalents to the requirements of this Section will be considered in accordance with the *Code for the transport and handling of hazardous and noxious liquid substances in bulk on offshore support vessels (OSV Chemical Code) 1.3 Equivalents.*

8.3 Design

8.3.1 The goals of this sub-Section are:

(h) To ensure that the cargo tanks are located in protected location(s) in the event of minor hull damage.

(i) To ensure that the cargo containment and handling systems are located so that the consequences of any release of cargo will be minimised, and to provide safe access for operation and inspection.

8.3.2 The vessel is to be designed in accordance with the following:

(a) The *Code for the transport and handling of hazardous and noxious liquid substances in bulk on offshore support vessels (OSV Chemical Code) 2.3 Non-cargo discharges below the freeboard deck.*

(b) The *Code for the transport and handling of hazardous and noxious liquid substances in bulk on offshore support vessels (OSV Chemical Code) 2.9 Location of cargo tanks.*

(c) The *Code for the transport and handling of hazardous and noxious liquid substances in bulk on offshore support vessels (OSV Chemical Code) 3 Vessel design.*

(d) Segregation of cargo tanks from spaces which are intended to be non-hazardous, where diagonal or corner to corner situations occur, will be specially considered. *See also Pt 4, Ch 9, 1.2 Application and ship arrangement 1.2.9* of the *Rules and Regulations for the Construction and Classification of Ships, July 2017, incorporating Notice No. 1, 2, 3 & 4*.

(e) With respect to access to spaces in the cargo area, spaces which are of confined or cellular construction adjacent to cargo or slop tanks, such as double bottom tanks and cofferdams, are to have dual access from the upper deck, spaced as widely apart as possible. Pipe tunnels and duct keels to which access is normally required for operational purposes are to be provided with means of access not more than 60 m apart. In all cases, however, access is to be provided at each end of the tunnel or duct keel.

8.4 Special requirements for products with a flashpoint not exceeding 60°C, toxic products and acid

8.4.1 The goal of this sub-Section is to ensure that the consequences of any release of liquid cargo with severe safety hazards, from compliant vessels, will be minimised; and to provide protection to the vessel and crew from fire, toxic vapour and corrosive substances.

8.4.2 Where the vessel is designed to carry cargoes with a flashpoint not exceeding 60°C, toxic products or acid, it shall comply with the following:

(a) The *Code for the transport and handling of hazardous and noxious liquid substances in bulk on offshore support vessels (OSV Chemical Code) 4 Special requirements for products with a flashpoint not exceeding 60°C, toxic products and acid.*

(b) With respect to toxic products, vapour return lines are to be fitted with shut-off valves and blank flanges.

(c) With respect to internal cargo tanks for the carriage of acids, the surface is to be smooth and free of obstruction, and the arrangements at corners are to be appropriate to the intended lining arrangements.

(d) With respect to tank or piping surfaces to be exposed to acid cargos, the corrosion protection lining is to be applied in a solid state.

(e) Linings approved for use with acids are considered to be an acid-resistant material that is applied to the tank or piping system in a solid state with a defined elasticity property, which is to be greater than the elasticity of the structural steel.

8.5 Cargo containment

8.5.1 The goal of this sub-Section is to ensure the safe containment of cargo under all foreseeable design and operating conditions having regard to the nature of the cargo carried.

8.5.2 The cargo containment arrangements of the vessel shall comply with the following:

(a) The *Code for the transport and handling of hazardous and noxious liquid substances in bulk on offshore support vessels (OSV Chemical Code) 5 Cargo containment.*

(b) Cargo tanks are to be as required by the *Rules and Regulations for the Construction and Classification of Ships for the Carriage of Liquid Chemicals in Bulk, July 2017, incorporating Notice No.1* or the *Rules and Regulations for the Construction and Classification of Ships for the Carriage of Liquefied Gases in Bulk, July 2017, incorporating Notice No. 1 & 2* as applicable for the intended cargo.

(c) Integral cargo tank scantlings and arrangements are to be in accordance with *Chapter LR V* of the *Rules and Regulations for the Construction and Classification of Ships for the Carriage of Liquid Chemicals in Bulk, July 2017, incorporating Notice No.1*.

(d) With respect to independent cargo tank scantlings and arrangements, these are to be considered on the basis of the standards contained in the classification Rules taking account of the cargo relative densities, and giving due consideration to the maximum pressure which will be encountered in service and the dynamic loading which will be experienced by the tanks, supports and keys. Calculations are to be submitted to enable the appraisal of the proposed arrangements.

(e) Where it is intended that vessels are to carry high temperature cargoes in independent cargo tanks, the tanks are to be supported and keyed so as to permit free expansion in all directions and to eliminate heat bridges which can transmit thermal stresses to the hull of the ship.

(f) All openings in independent cargo tanks are to be in the top of the tank and extended above the deck (alternative arrangements will be specially considered). Access is to be from the open deck direct, with arrangements for maintaining watertightness at the joint between the hatch coaming and the deck.

8.6 Materials of construction

8.6.1 The goal of this sub-Section is to ensure that the materials used in the construction of the vessel, piping, pumps, valves, vents and their jointing materials are of suitable quality and traceability, and shall be suitable for the temperature and pressure for their intended function in accordance with appropriate standards.

8.6.2 OSVs intended for the transport and handling of hazardous and noxious liquid substances in bulk shall comply with the following material requirements:

(a) Chapter *LR V Structural Arrangements and Scantlings* of the *Rules and Regulations for the Construction and Classification of Ships for the Carriage of Liquid Chemicals in Bulk, July 2017, incorporating Notice No.1*.

(b) Materials of construction for tanks, piping, fittings and pumps shall be in accordance with *Ch 6 Materials of construction and welding* of the *Rules and Regulations for the Construction and Classification of Ships for the Carriage of Liquid Chemicals in Bulk, July 2017, incorporating Notice No.1*, or *Ch 6 Materials of Construction and Quality Control* of the *Rules and Regulations for the Construction and Classification of Ships for the Carriage of Liquefied Gases in Bulk, July 2017, incorporating Notice No. 1 & 2*, as applicable.

8.7 Cargo transfer

8.7.1 The goal of this sub-Section is to ensure the safe handling of all cargoes, under all normal operating conditions and foreseeable emergency conditions, to minimise the risk to the vessel, its crew and the environment, having regard to the nature of the products involved through ensuring the integrity of integral liquid product tanks, piping systems and cargo hoses, preventing the uncontrolled transfer of cargo, and ensuring reliable means to fill and empty cargo tanks.

8.7.2 OSVs intended for the transport and handling of hazardous and noxious liquid substances in bulk shall comply with the following cargo transfer requirements:

(a) The *Code for the transport and handling of hazardous and noxious liquid substances in bulk on offshore support vessels (OSV Chemical Code) 6 Cargo Transfer*.

(b) The nominal thickness of steel pipes is to be not less than shown in *Table 12.2.4 Minimum thickness for steel pipes* in the *Rules and regulations for the classification of Ships, July 2017, incorporating Notice No. 1, 2, 3 & 4*.

(c) The use of and scantlings of stainless steel pipes will be specially considered.

(d) Welding, post-heat treatment and non-destructive examination for piping fabrication and jointing details is also to be in accordance with the requirements of *Ch 13 Requirements for Welded Construction* of the *Rules for the Manufacture, Testing and Certification of Materials, July 2017, incorporating Notice No. 1 & 2*.

(e) Standby means for pumping out each cargo tank are to be provided. *See Pt 5, Ch 15, 3.1 General 3.1.2* of the *Rules and Regulations for the Classification of Ships, July 2017, incorporating Notice No. 1, 2, 3 & 4*.

(f) Details of ship's cargo hoses are to be submitted together with a type test certificate issued by a recognised Authority.

(g) The extreme service temperature for ship's cargo hoses is to be taken as the highest and/or lowest service temperature for which the hose is intended.

8.8 Cargo tank venting

8.8.1 The goal of this sub-Section is to protect cargo containment systems from harmful over-pressure or under-pressure at all times.

8.8.2 The cargo tank venting arrangements for the vessel shall comply with the following:

(a) The *Code for the transport and handling of hazardous and noxious liquid substances in bulk on offshore support vessels (OSV Chemical Code) 7 Cargo Tank venting*.

(b) The system for guarding against liquid rising to a height which would exceed the design head of the cargo tanks is to be independent of the gauging devices.

(c) With respect to cargo tank venting, attention is drawn to the need to comply with any more onerous filling height restrictions imposed by the carriage of high relative density cargoes (i.e. above 1,025 t/m^3).

8.9 Electrical installations

8.9.1 The goal of this sub-Section is to ensure that electrical installations are designed so as to minimise the risk of fire and explosion from flammable products; and ensure availability of electrical generation and distribution systems relating to the safe carriage, handling and conditioning of cargoes.

8.9.2 The electrical installations aboard the vessel are to comply with the following:

(a) The *Code for the transport and handling of hazardous and noxious liquid substances in bulk on offshore support vessels (OSV Chemical Code) 8 Electrical installations*.

(b) *Pt 6, Ch 2 Electrical Engineering* of the *Rules and Regulations for the Classification of Ships, July 2017, incorporating Notice No. 1, 2, 3 & 4*.

(c) Where electrical equipment is to be of a 'safe type' in order to comply with *IEC 60092: Electrical installations in ships - Part 502: Tankers - Special features*, such equipment is to be certified for the gases/vapours involved. The construction and type testing are to be in accordance with IEC Publication *60079: Electrical Apparatus for Explosive Gas Atmospheres*, or an equivalent National Standard.

(d) For electrical installations for systems or tanks which are to carry chlorosulphonic acid, hydrochloric acid, nitric acid, oleum, phosphoric acid, sulphuric acid or trimethylacetic acid, the hazardous areas identified in *IEC 60092 Electrical installations in ships - Part 502: Tankers - Special features, 4.5 Tankers carrying cargoes (for example acids) reacting with other products/materials to evolve flammable gases* are applicable. The relevant gas group and temperature class are IIC T1.

(e) For electrical installations for systems or tanks which are to carry sulphur liquid, the hazardous areas identified in *IEC 60092 Electrical installations in ships - Part 502: Tankers - Special features, 4.3 Tankers carrying flammable liquids having a flashpoint exceeding 60ºC*, are applicable.

8.10 Mechanical ventilation in the cargo area

8.10.1 The goal of this sub-Section is to ensure that arrangements are provided for enclosed spaces in the cargo area to control the accumulation of flammable and/or toxic vapours.

8.10.2 Mechanical ventilation arrangements in the cargo area are to comply with the following:

(a) The *Code for the transport and handling of hazardous and noxious liquid substances in bulk on offshore support vessels (OSV Chemical Code) 10 Mechanical ventilation in the cargo area*.

(b) With respect to ventilation of spaces not normally entered, the particulars of the type and number of portable fans, their arrangement and means of attachment are to be submitted to LR for consideration in relation to the internal and external arrangement of the space concerned;

(i) increased ventilation will be required for spaces which contain gas-freeing systems, unless these systems are totally enclosed; and

(ii) ventilation systems are to be capable of use prior to entry and during occupation.

8.11 Instrumentation and automation systems

8.11.1 The goal of this sub-Section is to ensure that any instruments and automation systems provide for the safe carriage and handling of cargoes.

8.11.2 Instrumentation and automation systems on board the vessel shall comply with the *Code for the transport and handling of hazardous and noxious liquid substances in bulk on offshore support vessels (OSV Chemical Code) 11 instrumentation and automation systems.*

8.12 Pollution prevention requirements

8.12.1 The goal of this sub-Section is to ensure control of pollution from noxious liquid substances from offshore support vessels.

8.12.2 The vessel shall comply with the *Code for the transport and handling of hazardous and noxious liquid substances in bulk on offshore support vessels (OSV Chemical Code) 12 pollution prevention requirements.*

8.13 Carriage of liquefied gases

8.13.1 The goal of this sub-Section is to ensure that the vessel's design, arrangement and operational procedures are such as to minimise the risk to the vessel, its crew and the environment, when carrying liquefied gases in bulk.

8.13.2 Where the vessel is to carry liquefied gases as a cargo it shall comply with the following:

(a) Cargo tanks are to be as required by the *Rules and Regulations for the Construction and Classification of Ships for the Carriage of Liquefied Gases in Bulk, July 2017, incorporating Notice No. 1, 2, 3 & 4* as applicable for the intended cargo.

(b) The *Code for the transport and handling of hazardous and noxious liquid substances in bulk on offshore support vessels (OSV Chemical Code) 18.1 General*, noting that, in the context of the application of this Chapter of the code, deviation from specific requirements of the IGC code must first be agreed with the relevant Flag Administration and latterly presented to Lloyd's Register for special consideration.

(c) The *Code for the transport and handling of hazardous and noxious liquid substances in bulk on offshore support vessels (OSV Chemical Code) 18.2 Accommodation, service and machinery spaces and control stations*.
(d) The *Code for the transport and handling of hazardous and noxious liquid substances in bulk on offshore support vessels (OSV Chemical Code) 18.3 Cargo containment*.
(e) The *Code for the transport and handling of hazardous and noxious liquid substances in bulk on offshore support vessels (OSV Chemical Code) 18.4 Materials of construction*.
(f) The *Code for the transport and handling of hazardous and noxious liquid substances in bulk on offshore support vessels (OSV Chemical Code) 18.5 Vent system for cargo containment*.
(g) The *Code for the transport and handling of hazardous and noxious liquid substances in bulk on offshore support vessels (OSV Chemical Code) 18.6 Cargo transfer*.
(h) The *Code for the transport and handling of hazardous and noxious liquid substances in bulk on offshore support vessels (OSV Chemical Code) 18.7 Vapour detection*.
(i) The *Code for the transport and handling of hazardous and noxious liquid substances in bulk on offshore support vessels (OSV Chemical Code) 18.8 Gauging and level detection*.
(j) The *Code for the transport and handling of hazardous and noxious liquid substances in bulk on offshore support vessels (OSV Chemical Code) 18.9 Emergency shutdown system*.
(k) The *Code for the transport and handling of hazardous and noxious liquid substances in bulk on offshore support vessels (OSV Chemical Code) 18.12 Carriage of other liquefied gases listed in chapter 19 of the IGC Code* noting that, where a vessel is intended for carriage of liquefied gases listed in chapter 19 of the IGC Code, other than liquid carbon dioxide (high purity and reclaimed quality) or liquid nitrogen, then agreement on the relevant aspects of the IGC Code and any additional requirements are to be agreed during multi-party discussions to include the Flag Administration and LR.

Part 4, Chapter 7
Bulk Carriers

■ *Section 1*
General

1.6 Information required for CSR bulk carriers

1.6.3 A Ship Construction File (SCF) is to be provided on board of the ship containing information to facilitate inspection/survey, repair and maintenance. As a minimum it is to include documentation and plans in accordance with the requirements of the CSR ~~and in addition, where not already required by the CSR, documentation and plans as listed in *Pt 3, Ch 1, 5.3 Plans to be supplied* to the ship~~.

1.6.4 For CSR bulk carriers subject to *SOLAS - International Convention for the Safety of Life at Sea Chapter II-1 - Construction - Structure, subdivision and stability, machinery and electrical installations Part A-1 - Structure of ships Regulation 3-10 – Goal-based ship construction standards for bulk carriers and oil tankers*, ~~a Ship Construction File (SCF)~~ the SCF is to be provided instead in accordance with the requirements specified therein in SOLAS and for these goal-based standard ships an SCF contents list is to be prepared and submitted for approval. ~~Where not already required for the SCF, documentation and plans as listed in *Pt 3, Ch 1, 5.3 Plans to be supplied to the ship*, are also to be supplied.~~

1.6.5 These SCFs are also to include the documentation and plans as listed in *Pt 3, Ch 1, 5.3 Plans to be supplied to the ship*, where not already required by the CSR or *SOLAS - International Convention for the Safety of Life at Sea Chapter II-1 - Construction - Structure, subdivision and stability, machinery and electrical installations Part A-1 - Structure of ships Regulation 3-10 – Goal-based ship construction standards for bulk carriers and oil tankers*.

Existing paragraph 1.6.5 has been renumbered 1.6.6.

Part 4, Chapter 8
Container Ships

■ *Section 15*
Requirements for ships with large deck openings

15.3 Design loadings

15.3.4 The value and distribution of static cargo torque, M_{STC}, are to be specified by the designer based on the intended operation of the ship and are not to be less than minimum design value of static cargo torque. The minimum design value of static cargo torque, M_{STC}, at any position along the ship is defined as:

$M_{STC} = 15{,}7C_6B(\eta_s\eta_t + 0{,}7N_{sd}N_{td})$ kNm

η_s = the maximum number of stacks of containers over the breadth of the cargo hold

η_t = the maximum number of tiers of containers in the cargo hold amidships, excluding containers above the main deck or on the hatch covers

C_6 = distribution coefficient depending on the length, L_{pp}, as defined in *Table 8.15.3 Static cargo torque distribution factor*

N_{sd} = the maximum number of stacks of containers over the breadth, B, on hatch covers or above the main Deck

N_{td} = the number of tiers of containers on hatch covers or above the main deck amidships, excluding containers in cargo holds

B is given in *Pt 3, Ch 1, 6 Definitions.*

Part 4, Chapter 9
Double Hull Oil Tankers

■ *Section 1*
General

1.6 Information required for CSR Double Hull Oil Tankers

1.6.3 A Ship Construction File (SCF) is to be provided on board of the ship containing information to facilitate inspection/survey, repair and maintenance. As a minimum it is to include documentation and plans in accordance with the requirements of the CSR ~~and in addition, where not already required by the CSR, documentation and plans as listed in *Pt 3, Ch 1, 5.3 Plans to be supplied to the ship*~~.

1.6.4 For CSR ~~bulk carriers~~ double hull oil tankers subject to *SOLAS - International Convention for the Safety of Life at Sea Chapter II-1 - Construction - Structure, subdivision and stability, machinery and electrical installations Part A-1 - Structure of ships Regulation 3-10 – Goal-based ship construction standards for bulk carriers and oil tankers*, ~~a Ship Construction File (SCF)~~ the SCF is to be provided instead in accordance with the requirements specified therein in SOLAS and for these goal-based standard ships an SCF contents list is to be prepared and submitted for approval. ~~Where not already required for the SCF, documentation and plans as listed in *Pt 3, Ch 1, 5.3 Plans to be supplied to the ship*, are also to be supplied.~~

1.6.5 These SCFs are also to include the documentation and plans as listed in *Pt 3, Ch 1, 5.3 Plans to be supplied to the ship*, where not already required by the CSR or *SOLAS - International Convention for the Safety of Life at Sea Chapter II-1 - Construction - Structure, subdivision and stability, machinery and electrical installations Part A-1 - Structure of ships Regulation 3-10 – Goal-based ship construction standards for bulk carriers and oil tankers*.

Existing paragraph 1.6.5 has been renumbered 1.6.6.

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